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Success Story

Peroxide in Fuel Estimation and Concentration Test (PERFECT)

Payoff

The new Ozone Depleting Chemical (ODC)-free PERFECT method will replace current test methods used by both military and commercial agencies for aviation and diesel fuel qualification and potentially by the food industry to determine the useful life of cooking oil. When low sulfur diesel fuels are required throughout the United States, it is envisioned that the test method will be instrumental in ensuring the quality of diesel fuels.

Accomplishment

The Aero Propulsion and Power Directorate successfully demonstrated a new efficient, environmentally friendly test method to determine the peroxide content of aviation fuels. This PERFECT method reduces sample size by 90%, reduces laboratory waste by 95% and can analyze sample twelve times faster than the conventional method.

Background

The Clean Air Act requires the removal of ODCs from military and commercial specifications. The Directorate's Fuels Branch has been working with the American Society for Testing and Materials (ASTM) to eliminate ODCs from standard test methods used to qualify aviation fuels such as ASTM D 3703, Standard Test Method for Peroxide Number of Aviation Turbine Fuels. This test method requires the use of Freon 113, a known ODC. The determination of peroxide number is very important for aviation fuel, especially fuel that has been in storage for more than six months. The PERFECT unit, developed by the University of Dayton Research Institute under the Directorate's sponsorship, is a test for jet fuels that is similar to ASTM D 3703, but does not require the use of ODCs. A bench-top unit is available for laboratory use and a portable hand-held unit is available for field use. A team of Air Force, Army, Navy, Defense Fuel Supply Center and industry personnel was established to expedite development of the PERFECT method to be used in both military and commercial aviation jet fuel specifications. In June 1994, the Directorate managed a round robin test program that included ten different military and commercial laboratories testing both diesel and aviation fuel samples. The purpose of this test program was to prove the technology of the test method and provide ASTM with the data required to convert it into an ASTM standard test method.

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Additional information

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